

[Article]

# Rising Intercorporate Shareholding

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## Key words

intercorporate shareholding; managerial entrenchment; external takeover; sales persistence; revenue allocation

## Abstract

This paper specifies the sufficient condition under which both managers and shareholders of the firm are all better off by agreeing with the intercorporate shareholding contract commonly observed in the Japanese capital market. The model describes an agency setting where reciprocal ownership plays an explicit role as anti-takeover device, but there is no exogenous means of making managers act in shareholders' best interest without external takeover threats. In particular, assuming that sales persistence and revenue allocation between managers and shareholders varies with the firm's strategy, the model shows that (i) to reach unanimity in the intercorporate shareholding contract, managers have to commit to always keeping shareholders' gain greater than that under managerial entrenchment, and (ii) managers can increase equity position in the firm and thereby receive a significant part of the incremental gain even after deviating from managerial entrenchment, that compensates for some of the deprived private benefits. The findings provide some implications for the manner in which accounting information facilitates shareholders' assessment of the firm in the presence of agency conflicts.

## I Introduction

The Japanese corporate governance system is distinctly characterized by intercorporate shareholding which often extends to different industries and ties the member firms with a web of reciprocal share holdings. Equity position held by stable owners is believed to serve preventing potential raiders from conducting hostile takeovers. There are two contrary views as to the effects of the existence of intercorporate shareholding<sup>1)</sup>. Those who support the efficiency of mutual shareholding argue that removing the takeover threats enables managers to devote themselves to long-term value maximizing activities and thus managerial myopia ceases. Prior works along this line involves Osano (1996) and Arikawa and Kato (2004). While the former explores subgame perfect equilibrium in which all agents improve their welfare by agreeing with mutual shareholding contracts, the latter demonstrates the possibility that managerial private benefits are partially correlated with shareholders' interests in the presence of stable owners. On the other hand, dissidents contend that because market interference leads to an effective monitoring that makes managers always conscious of the profitability of the strategy being undertaken, the lack of such monitoring due to the difficulty of takeovers insulates managers from pursuing shareholders' interests. Isagawa (2007) shows an entrenchment model that provides rationale for the unwinding of intercorporate shareholding, consistent with the phenomenon after an array of

economic reforms in the 1990s. A somewhat different approach is taken by Clayton et al. (2005) who suggest that in a duopoly setting, whether mutual shareholding leads to amelioration of the firm performance crucially depends on the complementarities between each firm's products released to the market.

The purpose of this paper is to extend Osano's (1996) analytical framework to specify the sufficient condition under which the interests of entrenched managers and shareholders coincide; the fundamental question relates to what is required for managers to get reciprocal shareholding contract approved by shareholders. The model presented here incorporates a particular set of variables that represents sales persistence as well as a revenue allocation rate that indicates how much of sales are substantially under management control and allocated discretionally among various stakeholders. As Aoki (1988) argues, bargaining between management and shareholders alters the firm's strategy through affecting managerial objective function with greater focus on sales growth than market value maximization warrants. Viewed like this, intercorporate shareholding is endowed with an explicit role that to some extent eliminates the uncertainty of future sales realization via continuous fixated transactions among member firms. As long as the hurdle that hostile takeovers encounter enhances managerial bargaining power over the allocation of the firm value, managers exercise discretion in favor of saving as much as they can in the firm. The less is the anticipated shareholders' gain, the more likely market value of the firm is to fall so that the external takeover may occur. In contrast, the fact that hostile takeovers hardly succeed makes it difficult to find the equilibrium where all the agents would become better off under mutual shareholdings.

The results obtained here provide insights into how to understand contemporary rapid increase in intercorporate shareholdings between Japanese firms that once drastically decreased from 18.5% in 1987 to 7.6% in 2003<sup>2)</sup>. The profitability of Japanese firms is said to have recovered, but as the uncertainty surrounding the firm's economic environment increases it has become essential for managers to cope with the probability that potential raiders may interfere with the firm's management in case of performance deterioration. Managers are thus required to always keep shareholders' gain higher than that under managerial entrenchment regardless of the economic conditions. Such requirements are firmly reflected in the firms' commitment to increasing both dividend payments and share repurchases. Instead of surrendering a part of discretion over the value allocation, managers can enjoy the fruit of increased shareholder gains by investing more in their own firm's share. This alignment effect that stems from the reduction of agency costs as argued in the seminal paper by Jensen and Meckling (1976) leads to viable mutual shareholding contracts.

The rest of the paper proceeds as follows. Section II develops a benchmark model for the analysis which describes the managers' strategy in the absence of intercorporate shareholding. The key is how the external takeover threats alter managers' choice of project so that incumbent managers can avoid losing control of the firm. Section III derives the sufficient conditions under which intercorporate shareholding contracts strictly improves the welfare of all agents participating in the market. In doing so is proven the role of managerial ownership in more comprehensive way that binds the classical treatment of agency costs with currently disputed emphasis on shareholders' value maximization. Finally, section IV presents concluding remarks and remaining points to be discussed in finance and/or accounting literature.

## II The Economy

The essential ingredients of the model are that consistent with Osano (1996), given the external takeover threats, there are ex ante gains to trade shares of those firms whose performance is below the

permitted level, and the existence of such gains precludes managerial entrenchment. Consider a game between a firm and a raider, where both agents possess same information about the firm and try to maximize their respective utility. While the raider's utility function solely consists of the shareholder gain from holding the firm's equity, that of management encompasses not only the cash flow right but private benefits from discretionary control right. To avoid being ousted from the control of the firm, managers have to guarantee shareholder gains at least commensurate with the potential return from alternative investments. If external takeover does not occur, managers can derive additional benefits from exploiting more of the firm resources, otherwise utilized for maximizing shareholders' gain. Two factors entering into their utility are cash flow from the ownership of the firm's equity  $\alpha\pi_a S_{a,k}$  and the private benefits proportional to resources under managerial control  $\lambda(1 - \pi_a)S_{a,k}$ . The annual sales  $S_{a,k}$ , conditional on the strategy  $a$  that is undertaken in the state  $k$ , has variance  $\Delta_k$  that is identically independently distributed in each state  $k$ . Higher sales persistence is thus characterized by smaller  $\Delta_k$ .  $\lambda$  is considered here within the range of managerial discretion and  $\pi_a$  stands for the revenue allocation rate to shareholders ( $0 \leq \lambda, \pi_a \leq 1$ ). It is assumed that initially the incumbent managers and the potential raider hold equity positions of  $0 \leq \alpha \leq 0.5$  and  $\beta < 0.5$  in the firm respectively. The raider's gain from ownership of the firm is only related to the cash flow rights,  $\beta\pi_a S_{a,k}$ .

Before discussing the effects of intercorporate shareholding on the agents' benefits, this section briefly checks the firm's preference in the choice of the strategy unless reciprocal holding contracts are settled. First, the payoff structure of the two distinct strategies  $k \in \{M, S\}$  that management can undertake at the beginning of the period is defined symmetrically between the good state  $g$  and the bad state  $b$ . The nature of the state  $a \in \{g, b\}$  is characterized by the probability  $\sigma_g(\sigma_b = 1 - \sigma_g)$  that turns out after the strategy sets out. If managers conduct the strategy  $M$  that gives rise to agency costs in that they can pursue private benefits  $\lambda(1 - \pi_M)S_{M,k}$  at the cost of shareholders' wealth, the firm earns  $R_{M,g} = \pi_M(S + \Delta_M)$  in state  $g$  and  $R_{M,b} = \pi_M(S - \Delta_M)$  in state  $b$  at the end of the period. The counterparts obtained under the shareholder oriented strategy  $S$  are  $R_{S,g} = \pi_S(S + \Delta_S)$  in state  $g$  and  $R_{S,b} = \pi_S(S - \Delta_S)$  in state  $b$ . Note that  $S$  is the mean of annual sales identical through all the sets of strategy and nature,  $\{a, k\}$ , where  $a \in \{g, b\}$  and  $k \in \{M, S\}$ . It is assumed that the following parameter restrictions hold:

$$0 \leq \pi_M < \pi_S < 2\pi_M, \quad (1)$$

and

$$\Delta_M < \Delta_S. \quad (2)$$

Assumptions (1) and (2) are straightforward if strategy  $M$  warrants managerial entrenchment and aids in stabilizing annual sales, where managers are exposed to relatively low risk in the choice of projects and can arbitrarily dispose of more revenue for their private purposes than the strategy  $S$  takes place. The intuition behind these assumptions is directly derived from the empirical result of Chujo and Yamamoto (2005)<sup>3)</sup>. Also to ensure the possibility that external takeover improves firm performance by switching the strategy, the returns described above are put in the following order:

$$R_{M,b} < R_f \leq R_{S,b} < R_{M,g} < R_{S,g}, \quad (3)$$

where  $R_f$  represents net cash flow corresponding to risk free charge<sup>4)</sup>.

Provided with the assumptions (1)-(3), lemma 1 below shows that strategy  $M$  likely dominates over  $S$  under the condition of managerial entrenchment.

**Lemma 1.** *Given assumptions (1)-(3), a sufficient condition for managers to undertake strategy  $M$  under the condition that the potential raider does not make external takeover bids is:*

$$\frac{\lambda}{\alpha} \geq \frac{(\pi_S - \pi_M)S + (\sigma_g - \sigma_b)(\pi_S \Delta_S - \pi_M \Delta_M)}{(1 - \pi_M)[S + (\sigma_g - \sigma_b)\Delta_M]} \quad (4)$$

**Proof.** If the managers choose strategy  $M$ , the payoff of managers  $G_M$  is presented by

$$G_M = [\lambda + (\alpha - \lambda)\pi_M](S + (\sigma_g - \sigma_b)\Delta_M).$$

Similarly, if managers choose strategy  $S$ , they are deprived of the private benefits, then the payoff attributed to them  $G_S$  is

$$G_S = \alpha\pi_S[S + (\sigma_g - \sigma_b)\Delta_S].$$

Taking the difference  $G_M - G_S$  yields

$$\begin{aligned} & [(1 - \pi_M)\lambda - \alpha(\pi_S - \pi_M)]S + [(1 - \pi_M)\lambda\Delta_M - \alpha(\pi_S\Delta_S - \pi_M\Delta_M)](\sigma_g - \sigma_b) \\ & = [(1 - \pi_M)\lambda - \alpha(\pi_S - \pi_M)][S + \Delta_M(\sigma_g - \sigma_b)] - \alpha\pi_S(\Delta_S - \Delta_M)(\sigma_g - \sigma_b). \end{aligned}$$

The first term in the right-hand side of the equation is the difference between the expectation of removed benefits associated with managerial control over revenue allocation and that of incremental revenue claim attributable to managers' own equity ownership. The second term represents the effects of uncertainty increment on management utility, showing that when future prospects are unfavorable, i.e.,  $\sigma_g < \sigma_b$ , then managers, by choosing strategy  $M$ , can hedge the possible losses accruing to their own equity as revenue volatility increases. It is easily confirmed that the left-hand side is always positive if the inequality (4) of the lemma holds.

*Q. E. D.*

The right-hand side of the inequality (4) corresponds to managers' marginal rate of substitution at which managers are willing to choose strategy  $S$  in exchange for the private benefits generated by the discretionary revenue allocation. As long as managers' preference for retaining incumbent control relative to earning from their equity position exceeds this rate, the project  $M$  remains as an equilibrium strategy.

Next, let us introduce a potential raider who has an initial equity  $\beta$  of the firm<sup>5)</sup>. The addition of external takeover threats brings about the change in managerial gains in terms of the risk that the incumbent managers may be replaced if the shareholders' gains fall short of normal returns, i.e.,  $R_f$ . The next lemma depicts the fact that if external takeovers are viable, managers have to take more risk to maintain their entrenchment strategy.

**Lemma 2.** *Given assumptions (1)-(3), a sufficient condition for managers to undertake strategy  $S$  under the condition that the potential raider does make external takeover bids is:*

$$\frac{\lambda}{\alpha} < \frac{(\pi_S - \pi_M)S + (\pi_S\Delta_S - \pi_M\Delta_M)}{(1 - \pi_M)(S + \Delta_M)} \quad (5)$$

**Proof.** Similar to the proof of lemma 1, the expected managerial gains from undertaking each strategy are derived. Note that given assumption (3), the external takeover takes place in the bad state when the expected returns are smaller than  $R_f$ . If the manager chooses strategy  $M$ , now the payoff of managers  $G_M'$  follows as

$$G_M' = \sigma_g[\lambda + (\alpha - \lambda)\pi_M](S + \Delta_M) + \sigma_b\alpha\pi_S(S - \Delta_S).$$

The change appears in the payoff in case of bad states: because the low return triggers external takeovers with incumbent managers replaced, the lack of entrenchment enhances revenue allocation rate albeit in face of larger revenue volatility and successfully erases agency costs exploited by the predecessors. On the other hand, there is no change in the payoff to managers undertaking strategy  $S$ , that is

$$G_S' = G_S = \alpha\pi_S[S + (\sigma_g - \sigma_b)\Delta_S].$$

Again taking the difference  $G_M' - G_S'$  results in

$$\begin{aligned} & \{(1 - \pi_M)\lambda(S + \Delta_M) - \alpha[(\pi_S - \pi_M)S + (\pi_S\Delta_S - \pi_M\Delta_M)]\}\sigma_g \\ & = \{[(1 - \pi_M)\lambda - \alpha(\pi_S - \pi_M)](S + \Delta_M) - \alpha\pi_S(\Delta_S - \Delta_M)\}\sigma_g. \end{aligned}$$

The first term in the right-hand side of the equation represents the difference between incremental revenue claim attributable to managers' own equity ownership and removed benefits associated with managerial control over revenue allocation, both weighted by the probability  $\sigma_g$ . The second term represents managers' disutility associated with increased uncertainty, whereas the hedge does not work as in the case of no takeover threats. It is easily confirmed that the left-hand side is always negative if the inequality (5) of the lemma holds.

*Q. E. D.*

Somewhat abstract as it appears, the lemma gives intuition for understanding managerial incentives to reach at mutual shareholding contracts between familiar firms. The emphasis should be put on the prominent feature of the entrenchment strategy  $M$  that stabilizes the firm's sales revenue and, in turn, managemerial gains, in particular beneficial when bad states are anticipated to take place and if this is the case, it is determined from the outset that managers are excessively rewarded relative to the risk they bear. To mitigate this inefficiency does the takeover mechanism exist so that it thrusts up the hurdle obstacle to taking entrenchment strategies, but with the collusive relationships in complex web of mutual shareholdings, the mechanism tends to collapse. The question addressed in the subsequent section concerns if and under what condition the intercorporate shareholding can result in an equilibrium strategy such that various stakeholders are better off through giving consent to the contract.

### III The Impact of Intercorporate Shareholdings

For expositional ease,  $n$  firms, which are identical in expected profitability and/or state, enter the reciprocal shareholding contracts. The setting employed here conforms to Osano (1996) and it is assumed that every member firm equally holds  $1/(n - 1)$  of newly issued equity shares of other  $n - 1$  firms for the contract. Assuming further that the fraction of newly issued shares to those outstanding is  $\omega$ , the equity positions of managers and the raider are diluted to  $(1 - \omega)\alpha$  and  $(1 - \omega)\beta$  respectively. Given the homogeneity of the fundamental features among member firms, any type of cash transfers will not occur, because the market value of each firm, defined  $V(a)$  depends on the strategy  $a \in \{M, S\}$ , but under intercorporate shareholding contracts, the firms are supposed to select the same entrenchment strategy  $M$ , leading to the same value  $V(M)$  subject to the condition  $k$ . The cash needed to purchase  $\omega V(M)$  is thus financed by the receipt in exchange for the issuance of shares worth  $\omega V(M)$  to the rest of members. If the managerial ownership, together with intercorporate ownership occupies majority of the firm's outstanding shares, takeover is not feasible:  $(1 - \omega)\alpha + \omega > 0.5$ . Of course this constraint may appear too binding to encourage the raider's participation into the game, but since such an arrangement is of great use for abstracting from the stringent condition that should be fulfilled in the equilibrium, it is assumed to always hold in the subsequent analysis.

In this setting, consider the sufficient condition for such intercorporate shareholding contracts to be agreed between managers and the raider. The participation constraints require all the agents be better off in the payoffs under the cross ownership regime, when the payoffs of managers and the raider respectively follow as

$$W_M = (1 - \omega)\alpha V(M) + \lambda(1 - \pi_M)S_{M,k}, \quad (6a)$$

and

$$W_R = (1 - \omega)\beta V(M). \quad (6b)$$

On the other hand, the payoffs, when agents do not agree with the contracts and the condition shown in lemma 2 is met<sup>(6)</sup>, are respectively given by

$$W_M' = G_S' = \alpha\pi_S[S + (\sigma_g - \sigma_b)\Delta_S], \quad (7a)$$

and

$$W_R' = \beta\pi_S[S + (\sigma_g - \sigma_b)\Delta_S]. \quad (7b)$$

Now, it is easy to confirm that the conditions sufficient for managers and the raider to agree with the contracts have to meet

$$W_M' = \alpha\pi_S[S + (\sigma_g - \sigma_b)\Delta_S] \leq (1 - \omega)\alpha V(M) + \lambda(1 - \pi_M)S_{M,k} = W_M, \quad (8a)$$

and

$$W_R' = \beta\pi_S[S + (\sigma_g - \sigma_b)\Delta_S] \leq (1 - \omega)\beta V(M) = W_R. \quad (8b)$$

Recall that the market value  $V(M)$  coincides among member firms, and since it is written as

$$V(M) = \frac{\sigma_g R_{M,g} + \sigma_b R_{M,b}}{1 - \omega},$$

then the inequality (8a) reduces to

$$\alpha\pi_S[S + (\sigma_g - \sigma_b)\Delta_S] \leq [\lambda + (\alpha - \lambda)\pi_M][S + (\sigma_g - \sigma_b)\Delta_M], \quad (9a)$$

and similarly, (8b) to

$$\beta\pi_S[S + (\sigma_g - \sigma_b)\Delta_S] \leq \beta\pi_M[S + (\sigma_g - \sigma_b)\Delta_M]. \quad (9b)$$

These conditions yield the following proposition.

**Proposition 1.** *Given assumptions (1)-(3), there exists a level of revenue allocation rate  $\pi_M^* \geq \pi_M$  that satisfies both managers' and the raider's participation constraints, (9a) and (9b), where managers are willing to agree with reciprocal shareholding contracts regardless of any parametric realization regarding  $\alpha$  and  $\lambda$ . The raider takes part in the intercorporate shareholding contracts if and only if  $\pi_M^*$  satisfies:*

$$\pi_M < \frac{S - \Delta_S}{S - \Delta_M}\pi_S \leq \pi_M^* \leq \frac{S + \Delta_S}{S + \Delta_M}\pi_S \quad (10)$$

*In particular, when the state  $b$  is more likely than state  $g$ , i.e.,  $\sigma_g < \sigma_b$ , managers have to commit to maintaining the allocation rate at least commensurate with  $[(S - \Delta_S)/(S - \Delta_M)]\pi_S > \pi_M$  that warrants shareholders what exceeds or is equivalent to the normal returns  $R_f$ .*

**Proof.** To prove the proposition, the expression (9a) is rewritten in the form of

$$\lambda(1 - \pi_M)(S + \Delta_M) - \alpha[(\pi_S - \pi_M)S + (\sigma_g - \sigma_b)(\pi_S\Delta_S - \pi_M\Delta_M)]$$

As is immediately known from algebraic computation, if the second term is null irrespective of the magnitude of  $\alpha$ , the expression is nonnegative for any value of  $\lambda$ <sup>(7)</sup>.

Next, from (9b) the raider's participation constraint is rewritten as

$$\beta[(\pi_M - \pi_S)S + (\sigma_g - \sigma_b)(\pi_M\Delta_M - \pi_S\Delta_S)] \geq 0,$$

that requires the reduction in the raider's expected claims for both sales and sales volatility following strategic change from  $M$  to  $S$  be compensated, while there is no means but increasing the revenue allocation rate sufficiently to obtain the raider's approval for the contracts. Such is achieved by warranting  $\pi_M^*$  instead of  $\pi_M$  such that,

$$\pi_M^* \geq \frac{S + (\sigma_g - \sigma_b) \Delta_S}{S + (\sigma_g - \sigma_b) \Delta_M} \pi_S,$$

where inside the square bracket of the above expression is nonnegative regardless of the sign of the difference in each state occurrence probability. Finally, suppose that  $\sigma_g - \sigma_b \leq 0$ , in particular an extreme case of  $\sigma_g - \sigma_b = -1$ , where  $\pi_M^*$  equals  $[(S - \Delta_S)/(S - \Delta_M)]\pi_S$ . This is the case in which bad states dominate the good one and thus it is confirmed that the returns from managerial entrenchment strategy  $M$ ,  $\pi_M^*(S - \Delta_M) = \pi_S(S - \Delta_S) = R_{S,b} > Rf$  that is direct from the assumption (3). Note that the upper bound of  $\pi_M^*$ ,  $[(S + \Delta_S)/(S + \Delta_M)]\pi_S > \pi_S$  gives a solution for  $(\pi_S - \pi_M)S + (\sigma_g - \sigma_b) \cdot (\pi_S \Delta_S - \pi_M \Delta_M) = 0$ , so  $\pi_S = \pi_M^*$  also satisfies management participation constraint regardless of the relation between  $\alpha$  and  $\lambda$ .

*Q. E. D.*

The proposition contains relevant features in explaining currently observed phenomena toward reestablishing the extensive intercompany shareholding among Japanese business firms. To avoid hostile takeovers, managers prefer a significant fraction of shares be in hands of those with familiar relationships. Yet the lower revenue allocation under managerial entrenchment provides the raider with little incentive to hold the firm's equity instead of exerting pressure on managers. Obviously, the tradeoff associated with mutual shareholding contracts is to some extent resolved by enhancing the raider's gain, but now in turn to what extent the allocation rate is allowed to increase without largely hurting managerial interests should be addressed.

As long as  $\lambda/\alpha < 1$  holds, the condition (9a) is seemingly met for any value of  $\pi_M^*$ . That means managers relatively prefer gains from their equity position to those from the arbitrary use of firm resources, as directly confirmed by lemma 2. Casual arguments state that managerial ownership mitigates agency problems through the alignment effect, and if this is the case, the increase in  $\alpha$  is expected to improve the viability of equilibrium. To see this, let us prepare for the incentive compatibility constraints. Managers decide to remain in the blocking shareholding contracts when the payoffs from doing so exceed those from accepting tender offers from the potential raider. Straying from the agreed upon terms implicit in the contracts, i.e., never to sell the members' shares to the raider, induces a retaliation deal of equity positions held by the rest of members in the concerned firm. Whether to violate the contracts thus depends on the opportunity costs incurred to the firm losing protection against hostile takeovers.

Recall that the market value of each member firm is denoted as  $V(a)$  for  $a \in \{M, S\}$ . As the number of outstanding shares is diluted by intercompany shareholding, so is the fundamental of  $V(a)$ , written as  $(1 - \omega)^{-1} R_{a,k}$ . While the tender offer price may be higher than the fundamental, it is determined in view of the raider's maximization problem. Denote the price as  $Z_k$  for  $k \in \{g, b\}$ <sup>8)</sup>, and the accompanying costs as  $C$ . The raider attempts external takeovers if

$$0.5Z_k - (0.5 - \beta)Z_k - C \geq \beta R_{a,k}.$$

The first term in the left-hand side of the inequality represents gains from holding half of the firm's total shares given the realization of takeovers and replacement of incumbent managers, whereas the second and third term subtracted from gains are the total costs to grasp the firm's control. The inequality reduces to

$$\beta(Z_k - R_{a,k}) - C \geq 0, \quad (11)$$

that indicates the difference between the net takeover gain for the raider and the cost at which tender offers are made. To simplify the analysis, it is assumed that the condition (11) is satisfied only when managers undertake the entrenchment strategy, i.e.,  $a = M$ . This assumption completes the task for deriving the management maximization problem, that is

$$\max_{\{\alpha, \omega\}} (1 - \omega) V(a) + \lambda (1 - \pi_a) S_{a,k}, \quad (12)$$

subject to  $(1 - \omega)\alpha + \omega > 0.5$ . The following proposition characterizes the equilibrium in which all the agents are strictly better off under the intercorporate shareholding contracts.

**Proposition 2.** *Given the assumptions (1)-(3), there exists intercorporate shareholdings equilibrium in which all the agents are better off by agreeing with the contracts. The equilibrium is attained if all of the following statements are simultaneously satisfied:*

- (a) *The revenue allocation rate  $\pi_M^*$ , that increases in the success probability  $\sigma_g$ , is always greater than  $\pi_M$  prevailing under managerial entrenchment.*
- (b) *A significant part of profit given up by managers in the bargaining of  $\pi_M^*$  is recovered by increasing their own equity position  $\alpha$ .*
- (c) *The greater return expected from the success of external takeover makes it difficult for managers to maintain cross shareholding, but such difficulty is mitigated by decreasing their equity position  $\alpha$ .*
- (d) *The stability of the business relationship between member firms facilitates cross shareholding in the bad state, but not in the good state.*

**Proof.** See Appendix.

The proposition again emphasizes the essential part of proposition 1, that is, to draw the raider's attention, managers have to allocate more revenue to shareholders to the extent that does not largely reduce managers' gains. In doing so, managers get back some of what they lost by arranging the fraction of equity holding. No matter what the initial equity position  $\alpha$  and independent of the specific private benefit  $\lambda$ , incremental ownership aligns the interests between management and shareholders that tend to diverge and incur agency costs. Contrarily, the strength of the raider's motivation toward external takeovers, together with the fraction of managerial ownership possibly results in large opportunity costs associated with the rejection of tender offers, which would otherwise enhance total payoffs of incumbent managers. These findings enter into the core of the explanation for currently emerging phase of intercorporate shareholdings that is consistent with the efficient monitoring from shareholders. Further, it is necessary to recognize that another key to understanding the role of intercorporate shareholding is revenue persistence that is characterized in the model as the state contingent volatility of annual sales. The proof of the proposition demonstrates that the partial derivative of the smallest value of  $\lambda/\alpha$  with respect to  $\Delta_M$  obtains a positive sign and consequently shows that the marginal reduction in sales volatility effectively curtails the threshold that  $\lambda/\alpha$  should exceed to attain the equilibrium. Risk-averse managers would prefer relatively small but more stable revenues to potential big money subject to the extreme risk. In this sense, the central role of intercorporate shareholding leads to the risk hedge for the volatile revenue realization and it is straightforward that the relevance of risk hedge function manifests itself more prominently in bad states than in good states.

## IV Conclusion

This paper has shown that in the presence of takeover threats the intercorporate shareholding holds as a result of every agent's optimization behavior, conditional on the managerial commitments to always maintaining the revenue allocation higher than would be realized under the entrenchment strategy. An agency cost is embedded in terms of revenue allocation between managers and shareholders, and it is conspicuous when entrenched managers could acquire private benefits from the incumbent control of the



firm. Despite this problem, pursuit of private benefit in the form of relatively stable sales revenue and lower allocation under reciprocal holdings is consistent with equilibrium if an additional arrangement is made so that shareholder's gain at least equal to the normal returns is warranted. This arrangement however forces managers to surrender some fraction of their gains in exchange for the raider's approval to intercorporate shareholding contracts. The other arrangement to accomplish equilibrium puts focus on managerial ownership that compensates for some of losses associated with the higher revenue allocation to shareholders or the rejection of potentially beneficial tender offers. Anyhow, under certain conditions the intercorporate shareholding can enhance welfare of all the agents: for managers external takeovers are stringently restricted and stabilized revenue via fixed transactions helps avoiding risks of having access to unknown business partners and for shareholders minimum level of returns will be ensured even in the bad states. The findings presented here give plausible explanations for the currently observed rise in cross shareholding from the viewpoint of shareholders' wealth. The criticisms that unconditionally preclude the intercorporate shareholding thus lack relevance.

Some comments are made to address future research opportunities. The accounting literature has explored the relation between ownership structure and accounting information and the specific ownership structure including cross shareholding turns out to result in idiosyncratic informational properties. On the other hand, there is less attention to the theoretical model amplifying the role of accounting information per se in explaining the causes of ownership structure formation. The approach taken in this paper is one of such attempts, but it is insufficient to dynamically describe the valuation impact of ownership structure because the term structure is too simple and the firm's strategic decision is unrealistically limited. Some technical elaboration would be required to refine the model.

## Appendix

This appendix provides the proof of the proposition 2.

First, the incentive compatibility constraint for managers to be engaged in cross ownership is proven. If they reject the tender offers from the raider, their payoff from ongoing projects remains (6a), i.e.,

$$Y_M = W_M = (1 - \omega)\alpha V(M) + \lambda(1 - \pi_M)S_{M,k} = \alpha\pi_M S_{M,k} + \lambda(1 - \pi_M)S_{M,k} = [\lambda + (\alpha - \lambda)\pi_M]S_{M,k}.$$

Recall that from proposition 1 the participation constraint requires  $\pi_M$  be replaced by  $\pi_M^*$  as is expressed in (10) to involve the raider in the intercorporate shareholding contracts. Consequently, the managers' payoff becomes

$$Y_M = [\lambda + (\alpha - \lambda)\pi_M^*]S_{M,k}.$$

Contrarily, if managers accept tender offers, the corresponding payoff is presented by

$$Y_M' = (1 - \omega)\alpha[Z_k + \omega P_{a,k}],$$

where  $\omega P_{a,k}$  is the proceeds from the sale of member firms' shares at the tendering prices. Note that in this case the firm is taken over because all other member firms accept tender offers and liquidate their position in the violating firm. Given the homogeneity of each member firm's profitability, it can be written as  $P_{a,k} = Z_k + \omega P_{a,k}$ , that is reduced to  $P_{a,k} = (1 - \omega)^{-1}Z_k$ . Taking the difference between  $Y^M$  and  $Y_M'$  yields the sufficient condition as

$$\begin{aligned} & [\lambda + (\alpha - \lambda)\pi_M^*]S_{M,k} - \alpha Z_k \\ & = \lambda(1 - \pi_M^*) - \alpha[Z_k - \pi_M^*(S + (\sigma_g - \sigma_b)\Delta_M)] \geq 0 \end{aligned}$$

As is directly verified, this condition is satisfied if

$$\frac{\lambda}{\alpha} \geq \frac{Z_k - \pi_M^*[S + (\sigma_g - \sigma_b)\Delta_M]}{(1 - \pi_M^*)[S + (\sigma_g - \sigma_b)\Delta_M]}, \quad (A1)$$

and confirm that participation constraints (9a) and (9b) are met under  $\pi_M^*$ .

Differentiate the right-hand side of (A1) with respect to  $\pi_M^*$ ,  $Z_k$ , and  $\Delta_M$ , and the following inequalities obtain

$$\frac{\partial [\cdot]}{\partial \pi_M^*} = \frac{1}{(1 - \pi_M^*)^2} \left[ \frac{Z_k}{S + (\sigma_g - \sigma_b) \Delta_M} - 1 \right] < 0, \quad (\text{A2})$$

$$\frac{\partial [\cdot]}{\partial Z_k} = \frac{1}{(1 - \pi_M^*) [S + (\sigma_g - \sigma_b) \Delta_M]} > 0, \quad (\text{A3})$$

$$\frac{\partial [\cdot]}{\partial \Delta_M} = \frac{-(\sigma_g - \sigma_b) Z_k}{(1 - \pi_M^*) [S + (\sigma_g - \sigma_b) \Delta_M]^2}. \quad (\text{A4})$$

(A2) reveals the negative effects of incremental revenue allocation to shareholders on the hurdles in forming intercorporate shareholding. As the right-hand side of inequality (A1) decreases, the incentive compatibility constraint remains satisfied even if managers invest more in their own equity positions  $\alpha$ , i.e., the left-hand side decreases. Holding the proportion of available private benefit  $\lambda$  fixed, managerial gain expressed in (6a) increases in  $\alpha$ , and thus part (b) of the proposition is proven. Likewise, (A3) indicates that as long as the returns from external takeovers overwhelm those from ongoing strategy, the increase in former returns results in more stringent obstacles to enter into cross shareholding. Such obstacles are partially excluded by decreasing  $\alpha$ , as is mentioned in part (c) of the proposition. On the other hand, the sign of (A4) is not obvious, depending on the state probability. When state  $g$  is more likely to occur than  $b$ , then  $\sigma_g - \sigma_b > 0$  and the sign of (A4) is negative, and vice versa. This is what part (d) of the proposition mentions and completes the proof.

Q. E. D.

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## Notes

- 1) There is a large body of studies that analyze the monitoring role played by the block shareholders. For example, Admati et al. (1994) and Shleifer and Vishny (1986) report that the existence of block holders is positively evaluated by other diversified shareholders because the effective monitoring takes place albeit the free-rider problems. Yet the focus should be put on what kind of block holders take in charge of monitoring. As Lichtenberg and Pushner (1994) empirically point out, when other business firms are dominant shareholders of a particular firm, the productivity and financial performance of the firm virtually under control of these block holders deteriorate remarkably. This paper concerns whether mutual shareholding enhances the agents' welfare regardless of the monitoring function.
- 2) For the detailed data of time-series changes in the fraction of mutual shareholding, see NLI Research Institute (2004). The data deals with not only one-way shareholding but also completely reciprocal shareholding. It is not available since 2004, when the final press release as of fiscal year 2003 was published. According to *Nikkei Shimbun* (26/09/07), the long-term securities held by listed business firms sum up to ¥28 trillion, about 5.3% of the aggregate market capitalization of Tokyo Stock Exchange.
- 3) The mimeo is available upon request from the author. The intriguing finding thereof is that the first order autoregressive coefficient (AR) of annual sales is higher when the equity position of other business firms is relatively large compared with when it is relatively small.

- 4) An implicit assumption is imposed on the risk preference of agents: managers are risk averse whereas shareholders are risk neutral. Due to this assumption, risk free cash flow can be seen as the minimum return for shareholders. Of course even if shareholders are also risk averse, a minor change from  $R_f$  to some measure of cost of equity capital does not substantially alter the results.
- 5) While there is no explicit role endowed with other diversified investors for expositional ease, their equity position in the firm does not exceed  $1 - \alpha - \beta$ . The analysis precludes the free-rider problem that these investors incur because they can become the raider whenever they want, and thus without loss of generality focuses on the disciplinary role of the potential raider.
- 6) This reservation is made only to simplify the analysis. If the condition suggested in lemma 2 is not satisfied,  $W_M' = G_M' > G_S'$  and inequality (8a) is harder to hold in this situation. But since this modification will not substantially change the result, in order not to complicate the discussion, such a situation is discarded.
- 7) Note that  $\pi_M^*$  when  $\sigma_g - \sigma_b = 1$  exceeds  $\pi_S$  and possibly deprives managers of all of their private benefits, i.e.,  $\lambda = 0$ . Even in this case, confirm that the inequality (9a) still holds.
- 8) The tender offer price  $Z_k$  is set to the maximum value that would be attained if external takeovers succeed and the incumbent managers are replaced. It is also assumed that there is no possibility of such takeovers, the purpose of which centers on the prompt sale of the firm's assets that are evaluated under the book values.

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